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Subsurface Fluxes Beneath Large-Scale Convective Centers in the Indian Ocean ONR DRI: Coupled Air-Wave-Sea Processes in the Subtropics

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LONG-TERM GOALS

The long-term goal of this program is to understand the physics of small-scale oceanic processes and how they affect the larger scales of ocean circulation. Ongoing studies within the **Ocean Mixing Group** at OSU emphasize observations, interaction with turbulence modelers and an aggressive program of sensor / instrumentation development and integration.

OBJECTIVES

The principal objectives of this project are to investigate small-scale air-sea coupling in the equatorial Indian Ocean associated with the evolving structure of large-scale atmospheric convection during Madden-Julian Oscillation events. Specifically, to:

- quantify the detailed vertical and time-varying structure in both velocity and stratification of the Wyrtki jets. This measurement leads to estimation of *Ri* and potential parameterization of mixing;

assess negative feedbacks to atmospheric convection

- quantify sea surface cooling rates due to wind mixing and diurnal cooling;
- quantify sea surface cooling rates due to shear instability created by the highly-sheared currents, particularly the Wyrtki jets; and

assess positive feedbacks to atmospheric convection

- quantify sea surface heating rates (from both above and below) in thin near-surface fresh layers deposited by convective precipitation.

APPROACH

To accomplish these objectives, we are planning a 40-day shipboard experiment in the central/eastern Indian Ocean in Fall 2011. This is proposed in close collaboration with CINDY2011 / DYNAMO atmospheric components to measure surface and radar meteorology and fluxes, cloud structure, boundary layer turbulence and precipitation.

WORK COMPLETED

Several planning meetings have already occurred to help direct the DRI. A major meeting in Monterey (13-15 Oct, 2010) will set guidelines for this experiment. An international planning meeting in Tokyo (JAMSTEC) will set ship schedules. The PI has participated in and will continue to participate in these meetings.